

# SCAG Travel Model Improvement Program

*presented to*

**Southern California Association of Governments**

*presented by*

**Cambridge Systematics, Inc.**



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Transportation leadership you can trust.



## Overview of the Model Improvement Program

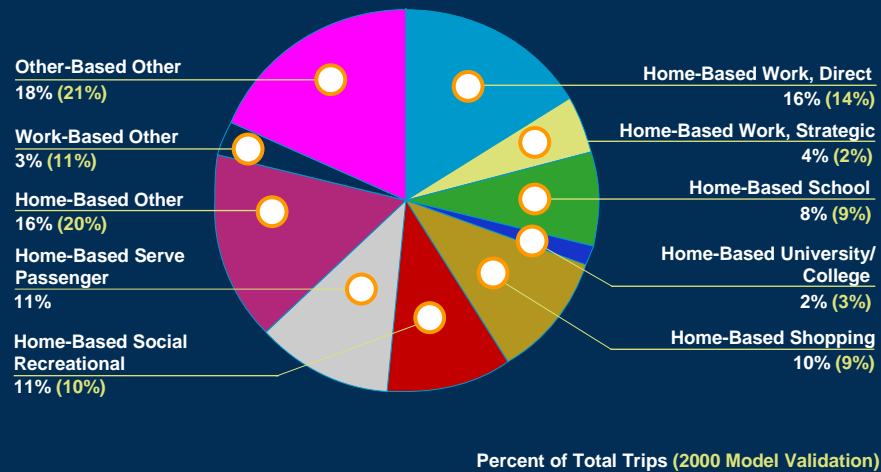
### ■ Current model improvements

- Trip generation and auto ownership models
- External trip models
- Mode choice models
- Trip distribution models

### ■ Future model improvements

- Freight models
- Time-of-day models
- Software evaluation and conversion

## Trip Purposes



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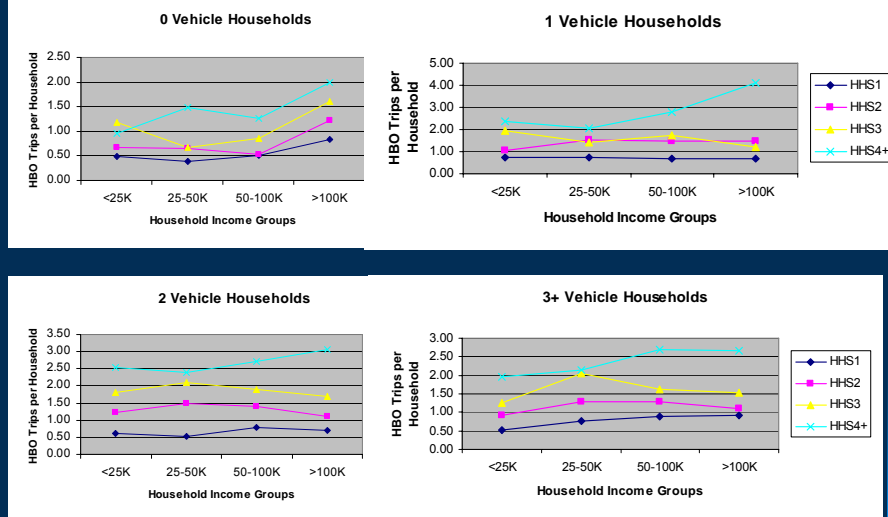
## Trip Rates by Person

Trip Purpose	Trips per Household	Trips per Person	Trips per Employee
Home-Based Work – Direct	1.60	0.52	1.15
Home-Based Work – Strategic	0.45	0.15	0.33
Home-Based University/College	0.19	0.06	0.13
Home-Based School	0.79	0.26	0.57
Home-Based Shopping	1.05	0.34	0.76
Home-Based Social Recreational	1.08	0.35	0.78
Home-Based Serve Passenger	1.15	0.38	0.83
Home-Based Other	1.62	0.53	1.17
Work-Based Other	0.31	0.10	0.22
Other-Based Other	1.86	0.61	1.34
<b>Total</b>	<b>10.11</b>	<b>3.30</b>	<b>7.28</b>
<b>2000 Model Validation</b>	<b>10.40</b>	<b>3.45</b>	<b>7.49</b>

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## Updated Trip Generation Models Example for Home-based Other Trips



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## Vehicle Availability Models

- Variables included
  - Persons per household
  - Workers per household
  - Household income
  - Persons by Age Group
    - Driving Age, 16-64
    - Retired Age, over 65
  - Accessibility
    - Highway
    - Transit
- Estimates households with vehicles available
  - 0 vehicles
  - 1 vehicle
  - 2 vehicles
  - 3 vehicles
  - 4+ vehicles

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## External Trips

- Expanded to match traffic counts
- Estimated by time of day, mode and purpose
- Person trips estimated from occupancy counts
- Internal-external person trips subtracted from trip generation model

External Vehicle Trips	Internal-External Vehicles	External-External Vehicles	Total External Vehicles
Total Externals	597,399	15,822	613,221
Percent Externals	97%	3%	

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## Trip Distribution

- Calibrate new friction factors by trip purpose and time period (peak/off-peak)
- Intermediate stop choice models will allocate home-based work strategic trips to intermediate stops after mode choice
- Validation tests will include
  - Trip length frequency distributions
  - County to County trip tables
  - Percent of intra-zonal trips

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## Mode Choice

- Compiled Six Surveys into a Single Estimation Dataset
- Weighted using Weighted Exogenous Sampling Maximum Likelihood (WESML)

Survey	Year	Records
Household	2001	121,792
Mode Augment	2001-2003	48,276
MTA BUS	2001	34,801
MTA RAIL	2001	15,452
OCTA	2001	13,805
METROLINK	2002	10,418
Total		244,544

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## Mode Choice

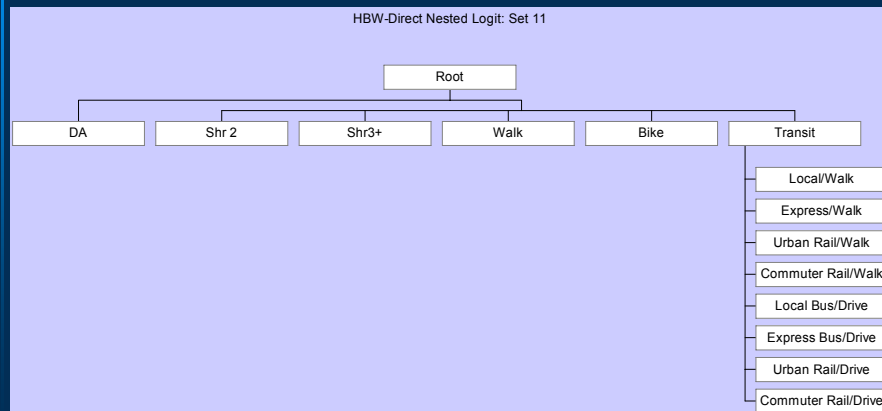
- Variables included
  - In-vehicle time
  - Out-of-vehicle time (walk, wait, transfer, drive access)
  - Cost (park, operating, fare) by income
  - Density (pop and emp)
  - Attractiveness (bike and walk)
  - Household size
  - Vehicles available
  - Vehicles per worker
- Estimates modes (13)
  - Drive Alone
  - Shared Ride 2
  - Shared Ride 3+
  - Local Bus (Walk and Drive Access)
  - Express Bus (Walk and Drive Access)
  - Urban Rail (Walk and Drive Access)
  - Commuter Rail (Walk and Drive Access)
  - Bike
  - Walk

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## Mode Choice Nesting Structure

### For Home-based Work Direct Trips

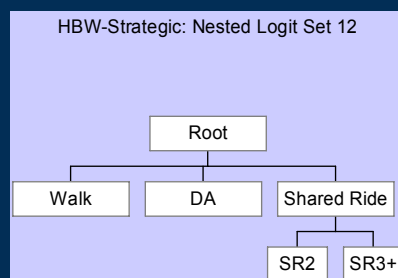


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## Mode Choice Model Nesting Structure

### For Home-based Work Strategic Trips

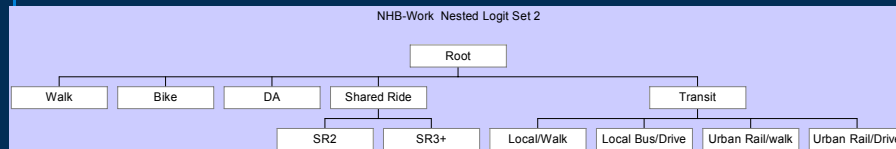


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## Mode Choice Model Nesting Structure

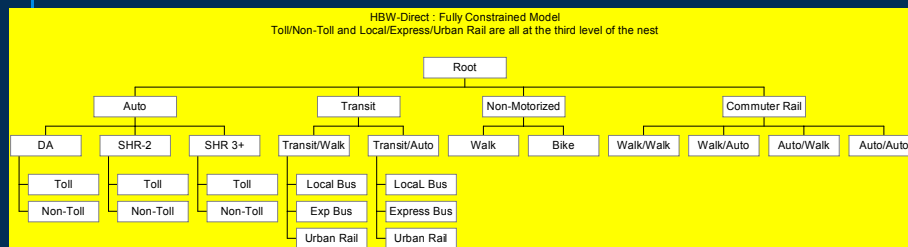
### For Work-based Other Trips



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## Alternative Constrained Nesting Structure



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## Mode Choice Model Variables

- In-Vehicle Travel Time for Auto, Transit, Walk and Bike
- Transit Walk Access/Egress and Transfer Walk Time
- Highway Terminal Times
- Initial Wait Time is a function of the Headway
- Transfer Wait Time(s)
- Transit Auto Access/Egress Time
- Parking Costs, Transit Fare, Auto Operating Costs
- Household Income Groups
- Population Density of the Production Zone
- Walk Friendliness Variable
- Urban Area Type Flag (Attraction Zone)
- Household Size
- Number of Autos per Worker
- Number of Autos per Licensed Drivers
- Peak and Offpeak Period

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## Status Report

- **Model development**
  - Trip generation and vehicle availability (complete)
  - External trip models (complete)
  - Mode choice (development complete, calibration underway)
  - Trip Distribution (calibration underway)
  - Trip assignment (SCAG)
- **Model validation**
  - Targets (complete)
  - Evaluation (underway)

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